THE EFFECTS OF NETWORK-CENTRIC ENABLED DISTRIBUTED OPERATIONS FORCES ON THE PRINCIPLES OF WAR

BY

LIEUTENANT COLONEL WILLIAM E. CALLAHAN
United States Marine Corps

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U.S. Army War College, Carlisle Barracks, PA 17013-5050

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by

Lieutenant Colonel William E. Callahan
United States Marine Corps

Colonel Lee DeRemer
Project Adviser

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

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Determine the effects of Network-Centric warfare on the principles of war. Has Network-Centric warfare truly enabled smaller formations such as are espoused by the USMC concept of Distributed Operations? If so, what are the key enablers of Network-Centric warfare that are necessary to enhance Distributed Operations? As the U.S. Military continues to strive to adopt more Special Operations Force like (SOF – like) capabilities amongst our conventional forces, these are some of the important questions that must be answered. Additionally, as these key enablers are identified, they must be applied in a manner that reduce friction for the smaller formation and help Distributed Operations forces to better see through the fog of war. They must be applied in a manner so as to enhance survivability and lethality and not be used strictly as a means to reduce the manpower footprint on the battlefield.

THE EFFECTS OF NETWORK-CENTRIC ENABLED DISTRIBUTED OPERATIONS FORCES ON THE PRINCIPLES OF WAR

As the United States Military continues to strive to ensure that it is properly postured to close with and defeat the adversaries with which it will be faced in the future, there are many important questions that need to be answered. One of these questions is how conventional forces should be best employed to meet the ever more dynamic challenges posed by a smart and tenacious enemy that is constantly adapting his own warfighting techniques to counter advantages that have long been enjoyed by U.S. forces. Most of the conventional U.S. ground forces are predominantly organized and equipped similar to how they were during the Cold War, when our primary adversary was more easily identified and his methods more predictable. To more effectively adapt to emerging threats, the Army has begun to field modular brigades, and the Marine Corps has recently unveiled its concept of Distributed Operations, as a means to organize and equip its conventional ground forces to better defeat the asymmetric threats predominant on the 21st century battlefield. Additionally, as the technologies envisioned in the concept of Network-Centric warfare become more mature, efforts are being made to fully integrate these technological enhancements into these new operating models for both the Army and Marine Corps.

As U.S. Military forces strive to adopt more Special Operations Force-like (SOF – like) capabilities among our conventional forces, as has been envisioned by many senior leaders, to include the current Chairman of the Joint Chiefs of Staff Admiral Mike Mullen[1], it is important that these capabilities are properly integrated and leave no gaps. Although the asymmetric threats these units will face will most likely be different from

those opposed during the Cold War, the same principles of war that have been a part of U.S. military dogma for decades are still considered valid by our doctrine. Some conclude, such as Robert R. Leonhard in his book, "The Principles of War for the Information Age," that the nine doctrinal principles of war no longer remain valid in the 21st century.[2] However, most still consider them to be fundamental to the formulation of U.S. military doctrine and that these deep-seated rules must be observed when formulating new operating concepts.

This paper will address the effects of Network-Centric warfare on the principles of war, and try to answer whether the Network-Centric formulation truly enables smaller formations such as are espoused by the USMC concept of Distributed Operations. It will also address which of the key components of Network-Centric warfare are necessary to enhance Distributed Operations. Additionally, as these key enablers are identified, this paper will put forward how they must be applied so that they reduce friction for the smaller formations. It is critical that Network Centric concepts contribute to Distributed Operations forces ability to better see through the fog of war while enhancing survivability and lethality, and not be used strictly as a means to reduce the manpower footprint on the battlefield.

Principles of War: Background.

The principles of war have been a part of joint doctrine since its inception[3] and are defined by Joint Publication 3-0 (JP 3-0) as Objective, Offensive, Mass, Economy of Force, Maneuver, Unity of Command, Security, Surprise, and Simplicity.[4] According to JP 3-0, these principles are the "enduring bedrock of U.S. military doctrine"[5] and are applicable across the full spectrum of conflict, including Military Operations Other Than

War (MOOTW), Counter Insurgency (COIN) warfare, and Major Combat Operations (MCO). These principles have been formulated and doctrinally entrenched through years of U.S. Military experience and are heavily influenced by the teachings of the preeminent scholars of warfare, including classical theorists like Sun Tzu, Clauswitz, and Napoleon, but also more modern theorists such as Fuller, Hart and Boyd. For decades these nine-principles have been instilled in the training of junior leaders from the beginning of their indoctrination into the U.S. military, whether the service is Army, Navy, Air Force or Marines. Leaders are taught that devising plans or strategies that violate or do not properly address these principles, whether leading a platoon or a division, is considered to be an anathema. Junior leaders are taught the acronym MOOSEMUSS that is composed from the first letter of each of the principles. This makes the nine principles easier to remember, lest they be forgotten or ignored when formulating even the simplest of military plans.

There is always some argument among both soldiers and scholars whether or not these same nine principles are timeless, or should they be revised as the nature of warfare changes. Ultimately, they have remained virtually unchanged for nearly ninety years since they were first published in U.S. Army Training Regulation No. 10-5 in 1921.[6] The latest version of Joint Publication 3-0, published in September of 2006, added the additional joint principles of restraint, perseverance and legitimacy; but the core nine principles still "guide warfighting at the strategic, operational, and tactical levels."[7] As the U.S. military develops and fields new capabilities and operating concepts that are enabled by Network-Centric warfare, do these accepted doctrinal principles remain valid? Despite dramatic changes in the way we fight, does the

fundamental nature of war remain the same?[8] Or is it the concept that needs to be

reexamined to ensure that it is not setting our military forces on a course that is not in

concert with accepted and proven principles? These are all questions that need to be

addressed when analyzing new concepts and their applicability to the theories of war.

Network-Centric Warfare: Background

In the seminal article published in the Naval Institute's *Proceedings* in January of

1998, Vice Admiral Arthur K. Cebrowski and John J. Gartska make the argument that

"Network-Centric warfare enables a shift from attrition style warfare to a much faster

and more effective warfighting style characterized by the new concepts of speed of

command and self-synchronization."[9] As a concept that is an element of the Revolution

in Military Affairs that has been taking place in the post cold war era, Network-Centric

warfare is envisioned as a methodology that will deliver the same powerful dynamics to

the U.S. military as it did for American business in the 1990s. A fundamental key to

enabling the operational model of Network-Centric warfare is a dependence on strong

communication links that connect many disparate sensors with command nodes and

"shooters."

As envisioned by Cebrowksi and Gartska, "Network-Centric warfare is applicable

to all levels of warfare and contributes to the coalescence of strategy, operations, and

tactics. It is transparent to mission, force size and composition, and geography."[10] The

concept, achieved by tremendous quantities of information that are generated by

modern Intelligence, Surveillance, and Reconnaissance (ISR) assets and the swiftness

with which that information can be distributed to nodes, will allow for commanders,

staffs and individuals to increase the rapidity of decision making about how to act

against their adversary on the battlefield. This increased decision making speed for commanders will have three predominate effects.[11]

The first effect of the increased speed of decision making made possible by Network-Centric operations is that the force will achieve information superiority. This will be achieved through significantly enhanced situational awareness and comprehension of the battle space, than would be normally achieved by gathering new and unfiltered data. This improved knowledge and enhanced perception will contain information such as position, direction and speed of movement of both the enemy and friendly forces. Obtaining information superiority over the adversary will require the emplacement of reliable sensors throughout the battlespace that are connected by fast and robust communications networks to displays that facilitate rapid and accurate decision making.

The second effect of increased speed of command made possible by Network-Centric warfare is that it enables a distributed force to act swiftly and with precision from great distances.[12] "Network-Centric warfare derives its power from the strong networking of a well-informed but geographically dispersed force."[13] This results in forces that are arrayed over a larger amount of territory yet remain able to effectively mass decisive combat power on an objective. This employment of a dispersed force will significantly complicate the adversary's ability to bring combat power to bear against friendly forces as they are operating in smaller formations, rather than in concentrated clusters of personnel and platforms.

The third result of the speed of command enabled by Network-Centric warfare is that the commander will be able to make decisions more rapidly and communicate

these decisions more quickly to a dispersed array of forces, thus securing a higher degree of responsiveness to his intent. The improved command, control, communications and computer (C4) connectivity in a Network-Centric enabled force will allow for friendly forces to synchronize combat power and bring it to bear on enemy formations before the enemy is able to react. It allows the Network-Centric commander to get inside the adversary's Observe, Orient, Decide and Act (OODA) loop[14], and through continued rapidity of decision making, shock the enemy and his own decision making ability through relentless application of destructive events.

USMC Distributed Operations concept: Background

Operations by conventional forces in the volatile, uncertain, complex and ambiguous environments that characterize the battlespace of the 21st century have compelled the U.S. military to develop more nimble strategies and adaptive tactics in order to maintain superiority on the battlefield. The Marine Corps has developed the concept of Distributed Operations for its conventional forces as a means to address these challenges. As stated by Secretary of Defense Donald Rumsfeld, "a revolution in military affairs is about more than building new high tech weapons….It's also about new ways of thinking, and new ways of fighting."[15] For the Marine Corps, Distributed Operations is a concept that enables new ways of thinking and fighting by facilitating the distribution of decision making authority to lower echelons of command to be executed by junior leaders that are more directly engaged in the fight. Advanced weapons and technology are enablers for this innovative way of employing conventional forces, but ultimately the focus of the Distributed Operations concept is on the capabilities of the individual Marine.

Like the concept of Network-Centric warfare, the ultimate goal of Distributed

Operations is increased speed of command. By distributing authority downward among

more and more experienced, well-trained and equipped junior leaders, a combination of

actions will be created that will result in a rapidly deteriorating effect upon the enemy,

thus shattering his ability to achieve cohesive efforts. "Units conducting Distributed

Operations will use these advantages to focus on the enemy's critical vulnerabilities,

exploiting fleeting opportunities, and thereby achieving tactical level successes that will

build rapidly to decisive outcomes at the operational level of war."[16] Although the

concept of Distributed Operations may seem revolutionary to some, it is actually an

evolutionary extension of how Marines have always traditionally fought and is well

grounded within the Marine Corps doctrine of Maneuver Warfare. Ultimately, it does not

change the basics of how Marine Corps forces will fight; rather it improves upon the

already established competencies and capabilities that the Marines bring to the Joint

Warfighting community.[17]

Although maximum decentralization of informed decision making by junior

leaders is the primary goal of Distributed Operations, establishment of redundant and

reliable communications networks is one of the key enablers necessary for its success.

Fundamental to the Distributed Operations concept is a network that provides

commanders with the ability to swiftly and unambiguously coordinate the actions of

widely separated units. It will "include over-the-horizon, on-the-move, and beyond-line-

of-site communications assets that connect commanders to distributed units and

provide connectivity throughout the force."[18] This network must be both robust and

resilient and with its successful employment among Distributed Operations capable

units, it will provide commanders with "an accurate picture of battle conditions over a larger area"[19] and will allow them to "better exploit actionable intelligence."[20] Undoubtedly, the Network-Centric environment envisioned by Cebrowski and Gartska is fundamentally essential for the Distributed Operations concept to be an effective means of fighting in the 21st century.

At this point a more detailed analysis of each of the nine principles of war, their applicability to the Marine Corps concept of Distributed Operation and the effects of Network-Centric warfare on each of the principles is in order. As each principle is analyzed, the risk associated with the employment of smaller, dispersed formations for each principle is addressed. Furthermore, measures that are necessary to mitigate the risk are proposed, and how the fundamentals of net-centric warfare either mitigate or contribute to this risk is discussed.

Objective

Objective is the most basic and obvious of the principles of war. Clear objectives must be understood by personnel that are operating at all levels of warfighting, from the strategic to the tactical. Without this clear understanding of objectives, unity of effort among all of the disparate elements prosecuting the war will be difficult or impossible to orchestrate. "The purpose of military operations is to achieve the military objectives that support the attainment of the overall political goals of the conflict. This frequently involves the destruction of the enemy armed forces' capabilities and their will to fight."[21] The ultimate goals of both the Network-Centric warfare and Distributed Operations concepts observe and contribute to achieving the principle of objective by providing the

commander a broader array of choices as to how to both approach and place effects upon the objective.

Recent conflict has shown that the enemies will to fight is often a much more effective target than complete destruction of his personnel and material. The rapid flow of critical information facilitated by Network-Centric operations allows for battlespace dominance that will quickly overwhelm the enemies ability to maneuver or anticipate friendly actions. The enhanced situation awareness of the Network-Centric commander will cause the enemy to believe that every move he makes can be quickly countered or blocked.   Distributed Operations enabled forces will contribute to this effect by extending the reach of the network so that its effects can be brought to bear upon enemy forces across greater frontage and depth on the battlefield.

Another way of examining the principle of objective is to consider it as the focus of effort. "Focus is the convergence of effects in time and space on some objective. It is the generation of superior combat power at a particular time and place."[22] As information dominance is achieved through Network-Centric operations, it will facilitate not only determining the focal point of effort, but also the speed that combat power can be converged on the objective. Network-Centric enabled Distributed Operations forces will provide for enhanced vision of the battlespace by proving a broader distribution of nodes, thus allowing for better focus on the objective.

Offensive

Staying on the offensive is a mindset that is ingrained in military leaders from the beginning of their training. Although there is inherent strength in a strong defensive posture, victory is achieved by staying on the attack.[23] Network-Centric enabled

Distributed Operations forces will have the flexibility and agility to stay on the offensive and seize the initiatives that are offered by adhering to this principle. "Offensive operations are characterized by rapid shifts in the main effort to take advantage of opportunities by momentum and by the deepest, most rapid, and simultaneous destruction of enemy defenses possible."[24] By distributing a force over a larger area on the battlefield, enemy weaknesses can be more quickly discovered and then exploited with network linked effects. A dispersed and agile force will also offer a much more difficult target for the enemy to detect and bring its own combat power against, thus reducing the necessity of reverting to a defensive posture.

While enhancing the force's ability to conduct offensive operations, there is risk associated with a distributed force, even if it is linked by a strong network. The inherent strength of mounting a strong, well coordinated and effective defense is put at risk by distributing the force across more space on the battlefield. This risk must be understood by the commander and be an integral part of his decision making when dispersing his forces. When operating with a Network-Centric Distributed Operations force it is critical to retain the capability to re-aggregate forces from an offensive posture into a formidable defense. The redundant communications links and enhanced situational awareness provided by a robust network can mitigate this risk.

Mass

Clausewitz tells us that "there is no higher and simpler law of strategy than that of keeping one's forces concentrated."[25] Of all nine principles of war, it is the principle of mass that is put most at risk by operating as a Distributed Operations force, even if this force is Network-Centric enabled. "The purpose of mass is to concentrate the effects of

combat power at the most advantageous place and time to produce decisive results."[26] Obviously by distributing combat power more broadly and deeply within the battlespace, the ability to pull this force together to mass its combat power is put in jeopardy.

This risk is alleviated by making use of well coordinated combat power effects that can be rapidly re-aggregated by the ensuring the distributed force is connected to a nimble and stout network. "Massing effects, rather than concentrating forces, can enable even numerically inferior forces to produce decisive results and minimize human losses and waste of resource."[27] Historically, the principle of mass focuses on the ability to bring formations of men and platforms closer together geographically, but a Network-Centric force will retain the ability to mass combat effects while still remaining in widely dispersed formations throughout the area of operations. By connecting the distributed forces as nodes in a Network-Centric force, the commander will retain the ability to mass combat effects in a timely and efficient manner, negating the necessity to physically aggregate the forces in the battlespace.

Economy of Force

"Economy of Force is the judicious employment and distribution of forces. It is the measured allocation of available combat power to such tasks as limited attacks, defense, delays, deception, or even retrograde operations to achieve mass elsewhere at the decisive point and time."[28] Clearly a Network-Centric enabled Distributed Operations force will enhance a commander's ability to successfully observe the principle of economy of force, even though adherence to this principle represents one of the most difficult dilemmas faced by a commander. This quandary was succinctly summarized by J.F.C. Fuller when he penned, "The rational distribution of force, this is

our problem in war;"[29] Network-Centric enabled Distributed Operations forces will provide the commander an edge in determining what the right sized force should be, and at what time this force can be most effectively employed. The concept provides the commander with not onlyanother effective means of employing a forces beyond traditional less-dispersed means, but also a force that is more lethal due to its ability to synchronize and coordinate decisive combat effects.

However, it is imperative that both Distributed Operations and Network-Centric warfare concepts not be seen as a means to justify a reduction in force structure. Although these capabilities can significantly enhance the capacity and lethality of smaller sized units, the commander must still have the same aggregate number of forces at his disposal so that the effects of distributing them throughout the battlespace can be achieved. A Network-Centric Distributed Operations force is an "additive capability,"[30] that should not be viewed as method of economizing the size of the force, but as a means to more economically employ the force.

Maneuver

"The purpose of maneuver is to place the enemy in a position of disadvantage through the flexible application of combat power."[31] Observance of this principle is deemed so fundamentally important that it has become the essence of the warfighting philosophy adopted and espoused by the United States Marine Corps over the last twenty years. As is stated in Marine Corps Doctrinal Publication One, "Maneuver warfare is a warfighting philosophy that seeks to shatter the enemy's cohesion through a variety of rapid, focused, and unexpected actions which create a turbulent and rapidly deteriorating situation with which the enemy cannot cope."[32] A commander that has a

Network-Centric Distributed Operations capable force at his disposal will have the ability to employ "small, highly capable units spread across a large area of operations [that] will provide the spatial advantage commonly sought in maneuver warfare."[33]

Clearly, taking advantage of the capabilities offered by Network-Centric enabled Distributed Operations forces can enhance the principle of maneuver so as to achieve an overwhelming position of superiority over the enemy. However, even though it has become of primal importance among the principles of warfare, it is vital that commanders not overlook or set aside the other eight principles for the sake of maneuver alone. As with most of the other principles, the key enabler of effective maneuver by a distributed force will be substantial and reliable communications networks that effectively link these maneuvering nodes throughout the battlespace.

Unity of Command

Napoleon tells us that "nothing is more important in war than unity of command."[34] However, the principle of unity of command is ostensibly put at risk the employment of Distributed Operations forces. One of the keys to the Distributed Operations concept is, "decentralization of informed decision-making" among a large number of junior leaders who are more directly involved in the fight. Additionally, one of the solutions necessary to mitigate this risk is emphasis on the use of mission type orders that succinctly state the commander's intent. Inherent in the effective application of the commander's intent is the training of junior leaders to operate in the absence of direct control and supervision of seasoned leadership.

The risk to unity of command posed by distributing forces can be further ameliorated by employing robust and reliable networks in order to strengthen the

commander's ability to observe and influence events within the battlespace. These communication networks and the associated ancillary technology need to be used not to centralize the approach to military decision making, but rather to "empower small unit leaders to act confidently on their commander's intent."[35] Indeed, more and more responsibility is placed on the shoulders of a significantly greater number of junior leaders when employing a Distributed Operations force. But if these separated units are made Network-Centric capable, the additive effects of their distributed nature can provide a commander with an enhanced ability to fight his unit as a whole even though they may be geographically separated in the battlespace.

Security

As was discussed when addressing the principle of offensive, the ability to re-aggregate forces from an offensive posture into a formidable defense may be put at risk by operating as a distributed force. Although there is much security intrinsic to a strong defensive posture, having forces closely aligned geographically in the battlespace does not often contribute to security. "Security enhances freedom of action by reducing friendly vulnerabilities to hostile acts, influence, or surprise.[36] Therefore, it seems that a distributed force will contribute to adherence to the principle of security, but this is stipulated by the distributed force having the ability to reform itself into stronger sized formations as the situation dictates.

"In the case of protection against enemy action, an increased degree of force protection is inherent in Distributed Operations, in that dispersion itself is a protective measure."[37] However, dispersing a force beyond the range of mutual support from direct or even indirect fire weapons systems has the potential to make the dispersed

force vulnerable. The key to alleviating this vulnerability is to strengthen the network

that connects the distributed force to units and platforms that can rapidly increase its

lethality if it finds itself in a situation where its security is unacceptably at risk. According

to Marine Corps Doctrinal Publication 1, "speed provides security."[38] Distributed forces

will certainly have their security enhanced through the "speed of command and self-

synchronization"[39] provided by Network-Centric capabilities.

Surprise

The principle of surprise is, according to Clausewitz, "more or less basic to all

operations, for without it superiority at the decisive point is hardly conceivable."[40]

Forces that are Distributed Operations and Network-Centric capable will be able to use

this important principle to their advantage. Distributing forces within the battlespace and

providing them with the information necessary to know when to decisively act upon the

commander's intent will allow them to "strike at a time or place or in a manner for which

the enemy is unprepared."[41]

However, with the boldness that is often necessary to achieve surprise there is

risk, and this risk can be multiplied as a force is further distributed. "While the element

of surprise is often of decisive importance, we must realize that it is difficult to achieve

and easy to lose."[42] It is therefore critical to mitigate this risk by ensuring that Network-

Centric capabilities are properly employed, and distributed forces never become over-

reliant on advances in technology simply for the sake of achieving surprise.

Simplicity

The principle of simplicity is put at risk by distributing forces in the battlespace.

The ease of control that is offered by more aggregated forces is easily lost as more

space is placed between units. This risk must be understood and efforts put in place to lessen its effects. "Simplicity and clarity of expression greatly facilitate mission execution in the stress, fatigue and other complications of modern combat."[43] As decision making by more junior and inexperienced leaders is required in a Distributed Operations environment; simple, concise and uncomplicated plans and orders are made even more essential. "The inherent chaos of the battlefield may be made worse by a vastly increased pipeline of information flowing at a rate beyond the ability to assimilate it." Knowing this, commanders will have to keep the principle of simplicity in mind and ensure that their intent, which is the linchpin of successful Distributed Operations, is not lost in the sea of information that can be provided through a Network-Centric environment. Legend has it that Napoleon used a Corporal to ensure his orders were clear and succinct. He would not relay his orders to his subordinate commanders until he was sure that even the most simple minded Corporal he could find was able to understand them. Even though the methods of transmitting orders and information has significantly changed with the advent of new technologies, keeping this example in mind will serve commanders well and serve to mitigate risk associated with operating in a complex dispersed Network-Centric environment.

<u>Proper Integration of Enabling Technologies</u>

As has been discussed while analyzing the nine principles of war, there are strengths, weaknesses, risks and enhancements associated with the employment of network enabled Distributed Operations forces. However one of the key ingredients that is necessary to guarantee success of the concept, is the proper integration of the new kinds of technologies that will be used to enable Network-Centric operations.

Ignoring the impact of technological innovation on the principles of war, is only surpassed in danger by the over-reliance, improper and rushed implementation of new technologies into proven tactics, techniques and procedures. In fact it is argued that "Network-Centric warfare, with its emphasis on fewer, faster-moving troops, turned out to be just about the last thing the US military needed when it came time to rebuild Iraq and Afghanistan."[44] This view is mainly due to failures in a counter insurgency fight being attributed to an over emphasis on technical solutions while at the same time not understanding the impact of Marines and soldiers on the ground and the human relationships that they cultivate.

Ultimately, integration of technology and questions of how new innovations can be properly incorporated "need to focus on providing the commander with knowledge and understanding in a form that allows his professional judgment and experience to be rapidly applied in a friction-filled environment."[45] With Distributed Operations, it must be kept in mind that this 'commander' may be a General commanding a Division or a Sergeant leading a squad. So no matter what the level of command, it is critical that the technology being used ultimately enhances decision making and not overwhelm the decision maker with information that may not be relevant or pertinent to the immediate task. Key to this premise is ensuring that leaders at all levels receive advanced and realistic training on the use and application of new technologies that will be fielded to their unit. There is no doubt that the United States armed forces most often have a technological edge over our enemies no matter the spectrum of war with which we are involved. Recognizing this, it is necessary to make sure that this advantage is used beneficially at a measured and prudent pace, and not rushed to provide new technical

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solutions until they have been thoroughly tested and integrated into standard operating procedures. Sorting out how to properly employ new technology in a fire fight is a recipe for failure, especially when forces are possibly more distributed and reliant on the skills of a fewer number of experts within each unit.

Conclusion

Although some will assert, as does Robert H. Leonard in his book "The Principles of War for the Information Age"[46], that the traditional nine principles of war are no longer valid, most often this argument is flawed. The nine principles remain a solid foundation of U.S. military doctrine, and are as applicable as ever, even if their application must be adjusted or seen through a different lens as new warfighting methods are adopted. Operating concepts must remain adaptable in the 21st century to counter an enemy that is more dynamic than ever. However, even as adjustments are made, the principles of war must remain a fundamental baseline. With change there is always risk, but there is even greater risk due to stagnation and failure to adapt not only to the enemy but also to advantages that new technologies make possible.   As has been posited, some of the principles of war are enhanced while others are put at risk by implementation of Network-Centric enabled Distributed Operations forces. The principles of objective, offensive, economy of force, maneuver, security and surprise ostensibly appear to be further strengthened by the proper employment of a Network-Centric enabled Distributed Operations force. Whereas the principles of mass, unity of command, and simplicity can possibly be put at risk when employing these operational concepts, however this risk can be mitigated. In order to do this, it is necessary to understand where risk may be likely and that measures are taken to ensure that it is ameliorated by

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implementation of strong networks and the careful and prudent application of advanced

technologies.

Endnotes

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